CAMBRIDGE HITACHI

Mult-e-Maths Toolbox

User Manual

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❶ Getting started

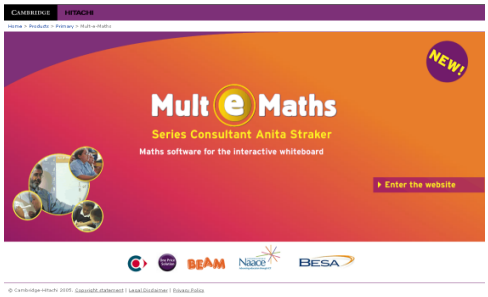
The *Mult-e-Maths Toolbox* is a highly versatile resource designed to help you to enhance mathematics teaching and learning. It is the ideal resource to support your creativity and to help you to make effective use of an interactive whiteboard.

There are over 60 flexible interactive tools in the *Mult-e-Maths Toolbox* that enable you to create and save single mathematical activities or whole lessons. Being easy to use, the tools can also be displayed spontaneously within lessons and used to further children's understanding of concepts.

This guide will help you to get the most out of the *Mult-e-Maths Toolbox*. It summarises the general features of the product and explains how the tools can be used and adapted to suit your children's needs.

Further information about the full range of Mult-e-Maths products can be found on our website:
http://www.cambridge-hitachi.com/products/primary/multemaths/
This can be launched by clicking on the Mult-e-Maths logo

in the top right-hand corner of the Toolbox workspace.



Visit the Mult-e-Maths website for more information about the range of products available.

The *Mult-e-Maths Toolbox* can be used in many ways. These include:

- Planning, setting up and saving a lesson;
- Using unprepared tools in class to support and enhance other activities;
- Sharing saved activities with colleagues who also use the Toolbox, via email or a network;
- Changing activities for use with different classes.

Technical information

Minimum system requirements

PC only
Microsoft Windows ® 98 SE/ME/NT/2000/XP
64 MB of RAM (128 MB recommended)
600 MHz minimum processor speed
50 MB free hard disk space
800×600 or higher screen resolution (1024×768 recommended)
16-bit or higher colour monitor (32-bit recommended)
Adobe Acrobat Reader 5.0 or higher

For technical support, contact us at:
techsupport@cambridge-hitachi.com
or call 01223 325040.

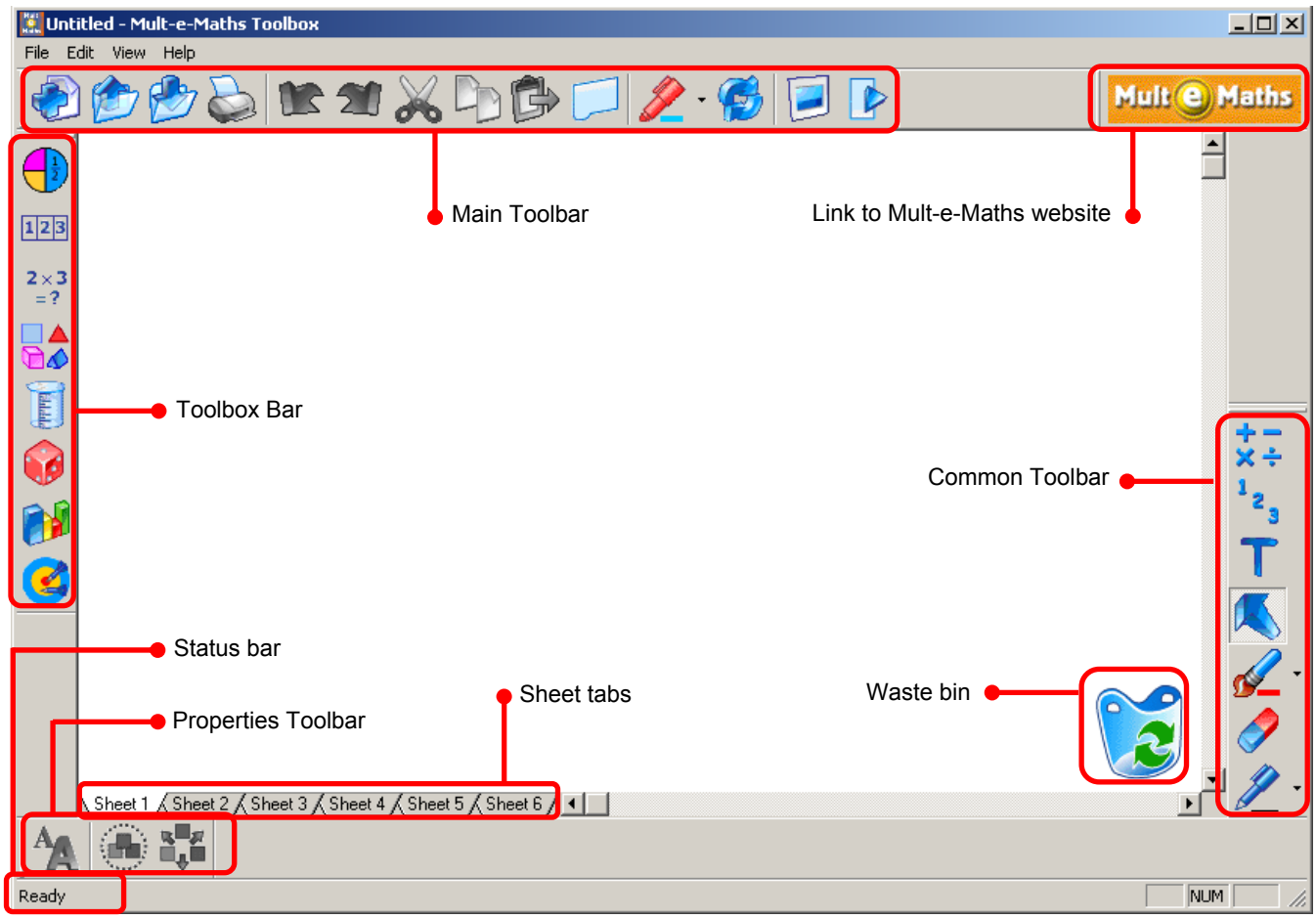
Screen resolution

If you prepare activities on a different computer from the one connected to your interactive whiteboard, you are strongly advised to ensure that the resolutions of both computer monitors are the same. This is because a smaller screen resolution provides you with a smaller workspace, so activities prepared at a higher resolution can occupy more space than those at a lower resolution. Please refer to your Microsoft Windows ® Help index for information about how to check and change the screen resolution.

❷ Workspace overview

The *Mult-e-Maths Toolbox* consists of a workspace with tools that you can use and combine to create and save customised learning experiences. Each Toolbox document contains six blank sheets, making it easy to produce a series of progressive activities. Since the tools are accessible at all times whilst using the program, the Toolbox is also suitable for more spontaneous use.

The main features of the workspace include:

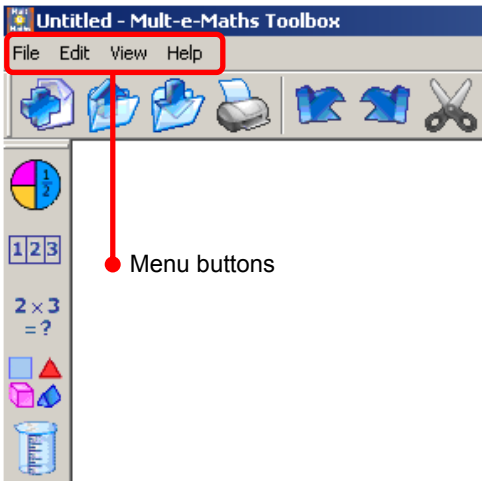


Menus

The *Mult-e-Maths Toolbox* has a drop-down menu system that allows you to interact with your Toolbox documents. These menus are File Menu (see page 5), Edit Menu (see page 6), View Menu (see page 6) and Help Menu (see page 6).

The menu options allow the user to: open, close and save documents and print sheets; select, cut, copy and paste objects; view or hide elements of the workspace; obtain information about the program. Shortcuts to several of these options are also available on the Main Toolbar (see page 7).

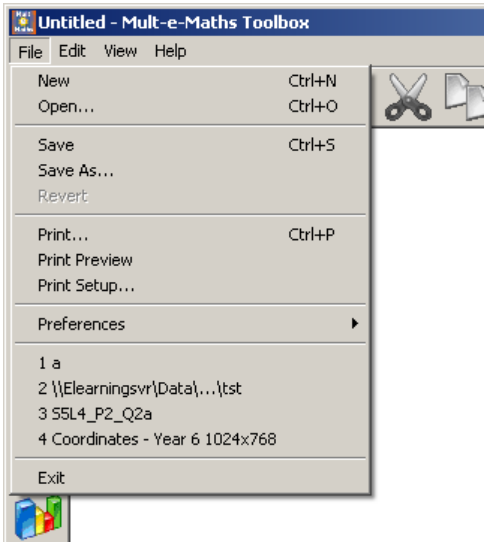
The following pages provide a detailed description of each drop-down menu.



Click a menu button to view the menu options.

File Menu

New	Access a blank Toolbox document.
Open…	Find and open a previously saved Toolbox document.
Save	Save the current document with its current file name and location.
Save As…	Save the current document with a different file name or location.
Revert	Return the current document to its most recently saved version, losing any changes made since the last save.
Print…	Print the current sheet. The default layout is landscape.
Print Preview	See how the current sheet will look when printed.
Print Setup…	Change the print options.
Preferences	Change the snapping objects feature (see below for details).
Recent files	See a list of the four documents opened most recently.
Exit	Exit the *Mult-e-Maths Toolbox.*



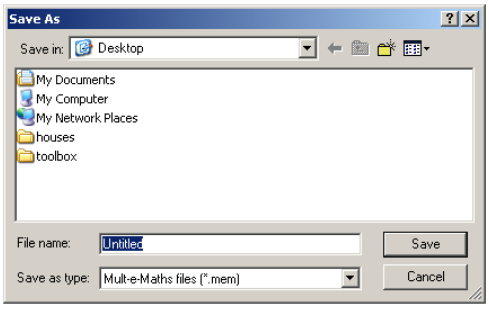
The menu bar with the File Menu open

Saving

Toolbox documents are saved as 'mem' files (files with a .mem extension, e.g. Countingin10s.mem).

After creating a new document choose File > Save As... In the 'Save As' dialogue box, choose the location you want to save the document to. Then choose a name for the document and click 'Save'.

To save the changes made to an existing document choose File > Save. Alternatively you can click the 'Save' button on the Main Toolbar (see page 7).

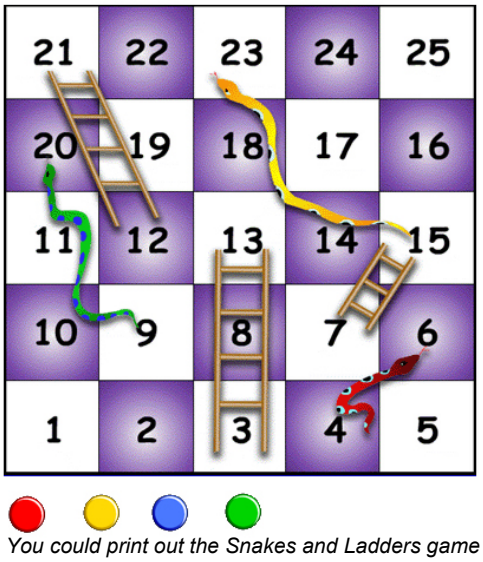


The 'Save As' dialogue box

Printing

You may find it useful to print out a sheet prepared in the Toolbox for children to use as an independent activity, e.g. the Snakes and Ladders Game Board. To do this choose File > Print... or click the 'Print' button on the Main Toolbar (see page 7).

To alter the print settings choose File > Print Setup…



You could print out the Snakes and Ladders game for children to play independently.

Preferences

This sub-menu contains two options which are revealed by hovering the cursor over 'Preferences':

Workbench size: If you are creating activities on a computer with a screen resolution significantly larger than that of your interactive whiteboard computer (e.g. 1280 × 1024 as opposed to 800 × 600), you can create an outline of the area available for your activity. This will help you to ensure that your activity will be wholly visible on the interactive whiteboard (see 'Screen resolution' on page 3). Click on the 'Workbench size' option and, using the table opposite, type the appropriate workbench dimensions for your whiteboard computer screen resolution into the 'Workbench Size' dialogue box. Clicking on 'OK' will create the appropriate area outline on your screen.

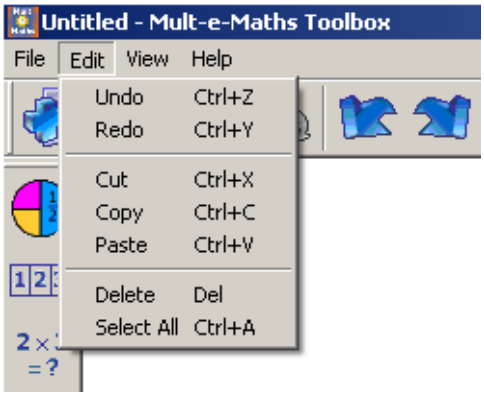
Screen resolution	Workbench width	Workbench height
800 × 600	690	415
1024 × 768	915	585
1152 × 864	1040	680

Table showing the workbench dimensions for different screen resolutions

Snap together: With the default Toolbox setting, when you place one 2-D shape close to another, their sides will snap together. If you want to disable snapping, untick the Snap together option.

Edit Menu

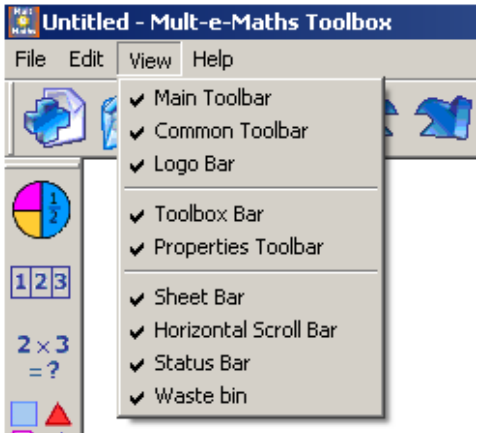
Undo	Undo the last action on the sheet.
Redo	Cancel the latest 'undone' action.
Cut	Remove selected object(s) from the sheet to the clipboard.
Copy	Copy selected object(s) from the sheet to the clipboard.
Paste	Transfer the latest content of the clipboard (i.e. a cut or copied object) to the sheet.
Delete	Remove selected object(s) from the sheet without storing on the clipboard.
Select All	Select all objects on the current sheet.



The Edit Menu

View Menu

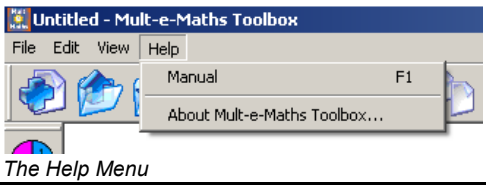
This enables you to hide toolbars or other elements of the workspace. See the General screen features section (page 10) for descriptions of some of these elements.



The View Menu

Help Menu

As well as including the *User Manual*, the Help Menu allows you to view basic information about the *Mult-e-Maths Toolbox*.



The Help Menu

General toolbars

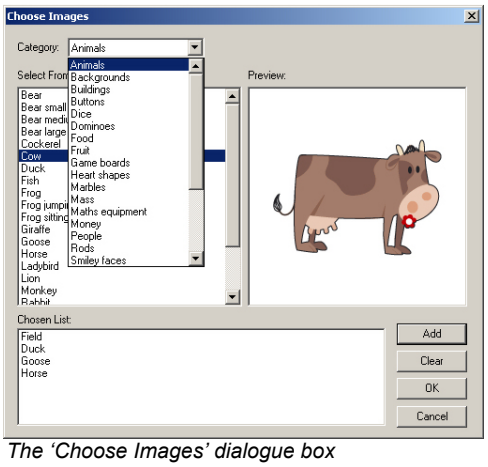
Main Toolbar

For ease of use, some of the more frequently used menu options are also available as buttons on the Main Toolbar along the top of the screen. There are also other useful tools available on this toolbar.

	New	Create a blank Toolbox document.
	Open	Find and open a previously saved Toolbox document.
	Save	Save the current document with its current file name and location.
	Print	Print the current sheet.
	Undo	Undo the last action on the sheet.
	Redo	Cancel the latest 'undone' action.
	Cut	Remove selected object(s) from the sheet to the clipboard.
	Copy	Copy selected object(s) from the sheet to the clipboard.
	Paste	Transfer the latest content of the clipboard (i.e. a cut or copied object) to the sheet.
	Clear	Remove all objects from the current sheet of the current Toolbox document.
	Highlight	Highlight parts of typed words or numbers.
	Rotate	Click this button and then click an object (shape or image) to rotate it manually.
	Image bank	Choose from a bank of images that can be copied onto a sheet.
	Curtain	Display grab-handles that can be dragged to hide and reveal parts of the sheet.

Image bank

To stimulate children's imaginations and mental imagery, you may wish to prepare activities using the Image bank (see example below). It gives you the freedom to create real life situations on which to base mathematical problems. From the drop-down menu in the 'Choose Images' dialogue box you can choose from a selection of backgrounds, game boards and other objects, e.g. money, food, people and animals.



The 'Choose Images' dialogue box

Click the image name to highlight it, then click the 'Add' button. You can add more images to your current selection, then, when ready, click the 'OK' button to place the images on the sheet. **Note:** By holding down the control key on your keyboard and clicking image names in the list, you can select several images at once to add to your chosen list.

Once on the sheet, images can be resized. To do this click on an image to select it, then click the 'Properties' button and alter the scale as desired.

Example: Use a blank sheet. Click the 'Image bank' button and choose Backgrounds from the drop-down menu. Select Sports shop, then click the 'Add' and 'OK' buttons.

Click the 'Symbol pad' button (see page 8) and enter a price. Drag the price onto one of the items in the Sports shop scene. Repeat, adding price labels to various items in the scene.

You have exactly £40 to spend on T-shirts.
Which T-shirts could you buy?

Use the Image bank to create problems for children to solve.

Create word problems for children to solve based on the prices you have assigned to items in the shop scene. You could type the problems on the screen using the text tool (see page 8). Children's answers and reasoning could be recorded on the screen using the pen tool .

Common Toolbar

These tools can be used alone or alongside the specialised Toolboxes for added functionality.

	Symbol pad	Generate a string of numbers and symbols, displayed in the text box area of the dialogue box. Drag the string onto the sheet to display it as an object.
	Number pad	Drag characters (digits 0–9, decimal point, minus sign) onto the screen.
	Text	Use this button to insert a text field. Then use the Keyboard pad and Number pad, or your computer keyboard, to enter text.
	Select	Click on this button to enable you to select menu options, click buttons and select objects. Clicking on this button turns off other tools (e.g. pen, eraser, rotate).
	Palette	Change the pen colour. The colour selected here will also be the colour of text entered using the text tool, and of lines and arrows drawn from within the Shape and Space Toolbox (see page 19).
	Eraser	Click on this button and then on pen markings to erase them.
	Pen / Pen thickness	Draw freeform shapes on the sheet. The 'Pen' button features a drop-down menu to change the thickness of the line. The selected pen thickness also determines the thickness of lines and arrows from the Shape and Space Toolbox (see page 19).

Adding text

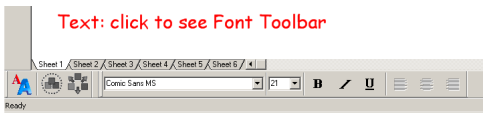
Choose the 'Text' button and click the cursor where you would like the text to appear (it can be repositioned by dragging later). Use the Keyboard pad and the Number pad, or your computer keyboard, to enter the desired text. Click away from your completed text to close the Keyboard pad and the Number pad.

Click the 'Symbol pad' button to type numbers with units of measurement, equations or inequalities. Enter the desired characters and drag the expression from the 'Symbol pad' dialogue box to the sheet. (**Note:** When the 'Text' tool is being used, characters typed on the Symbol pad will automatically appear on the sheet.)

Changing text

Clicking on text, numbers or an object containing a label reveals the **font toolbar**. You can change the font or font size, set the text to bold or italic, or underline text. If you have entered two or more lines in one piece of text, you can align them to the left, centre or right. There is an abbreviated font toolbar (without the alignment feature) for labels, for example within the Block Graph tool (see page 29).

To change the text colour after typing, click the 'Palette' button and select a colour from the drop-down menu of colours. Then drag the cursor over the text you wish to change.



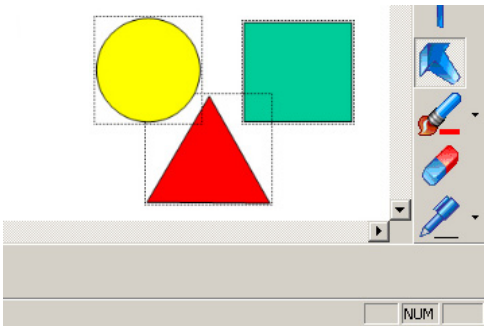
The font toolbar is displayed below the Sheet tabs.

Use the 'Palette' button to change the text colour.

Selecting objects

To select an object, choose the 'Select' button and click on the object. If an object is capable of being resized or having part of itself moved in some way, it is displayed with grab handles, i.e. small squares that can be dragged.

To select several objects simultaneously, click on an empty part of the screen near the shapes and drag the cursor so that at least part of each object is included in the dotted rectangle drawn. Each selected object will then be displayed inside its own dotted rectangle. The objects can now be moved as one by clicking and dragging one of the selected objects. (See page 9 for how to group several objects indefinitely.)



Three selected objects

Properties Toolbar

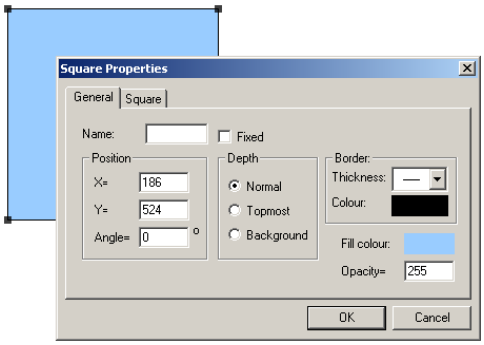
The Properties Toolbar allows you to change the properties of objects.

	Edit Properties	Alter the variables of an object or group of objects.
	Group	Group two or more objects together.
	Ungroup	Separate a group of objects into the original components.

Editing properties

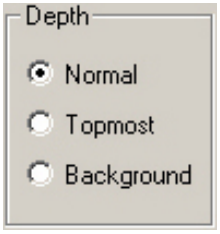
Each object inserted on a sheet has its own bank of properties which can be altered through its 'Properties' dialogue box. Select an object and then click the 'Edit Properties' button . You can now alter any properties available for that object. These properties include both object-specific features, e.g. transparency settings (see page 20) for the fill colour of a square created using the 2-D shapes, and general features, e.g. depth settings (see below).

If you choose the 'Edit Properties' button when more than one object is selected, you will find a different set of options, allowing you to fix the object in place, change the collective depth level (see below), or change the properties of the objects' labels.

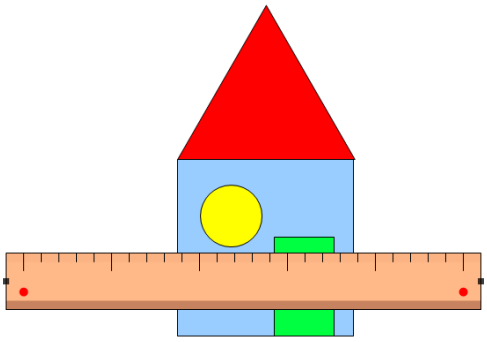


The 'Properties' dialogue box for a square

Depth: Objects can exist on one of three layers on a sheet: Normal, Topmost or Background – the default is Normal. Objects on the Topmost layer are always shown on top of objects on the other two layers. Objects on the Background layer always appear under the objects in the other two layers. The current or last selected object on a particular layer is displayed on top of other objects on that layer.



To move an object to a particular layer, select the object, click the 'Edit Properties' button and select the appropriate radio button in the section marked Depth. For example, to measure the features of the house on the right, made using 2-D shapes, set the ruler to Topmost depth, the roof and walls of the house to Background depth and the window and door to Normal depth.



An activity using the depth feature

Grouping/ungrouping Objects

When multiple objects are selected (see page 8) they can be moved around the sheet together. However, once you click somewhere else on the sheet the objects become separated again.

To group several objects together indefinitely, select the required objects as before and click the 'Group' button on the Properties Toolbar. One dotted rectangle is now shown encompassing all the selected objects. These objects can be moved and deleted as one.

This facility allows you to reflect or rotate compound 2-D shapes made using the Shape and Space Tools (see page 19).

To separate the selected objects, click the 'Ungroup' button on the Properties Toolbar.

Toolbox Bar

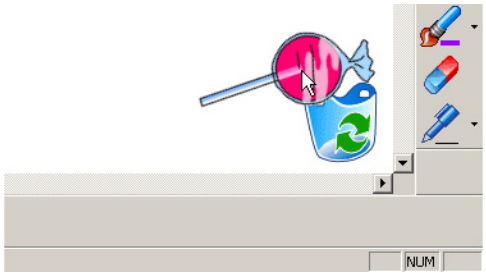
The Toolbox Bar provides access to the specialised toolboxes within the *Mult-e-Maths Toolbox*. Each toolbox contains a set of tools pertaining to a particular subject:

	Fractions Toolbox	Fraction Labels, Fraction Wall, Equivalence Machine, Fractions of Quantities, Fractions of Circles, Fractions of Squares (see page 11)
	Numbers Toolbox	Number Grids, Number Lines, Number Tracks, Number Sequences, Place Value Chart, Place Value Mat, Abacus, Estimating Numbers of Objects, Estimating on a Number Line, Function Machine (see page 13)
	Calculations Toolbox	Calculator, Function Machine, Abacus, Number Grids, Number Lines, Number Tracks, Number Sequences (see page 19)
	Shape and Space Toolbox	2-D Shape Tools, Regular Polygon Drawing Tools, Line and Arrow Drawing Tools, 3-D Shapes, Angle Tools, Protractors, Coordinate and Background Grids (see page 19)
	Measures Toolbox	Analogue Clocks, Digital Clock, Stopwatch, Calendar, Ruler, Measuring Cylinder, Weighing Scales (see page 24)
	Probability Toolbox	Spinners, Dice, Coin, Marble Bag (see page 28)
	Handling Data Toolbox	Block Graph, Tally Chart, Pictogram, Carroll Diagrams, Venn Diagrams, Tree Diagrams (see page 29)
	Solving Problems Toolbox	Dartboards and Target Board, Arithmagons, Background Grids, Game Boards (see page 31)

General screen features

Waste bin

Dragging objects onto the Waste bin icon in the lower corner of the sheet (so that the cursor is over the bin) deletes them.



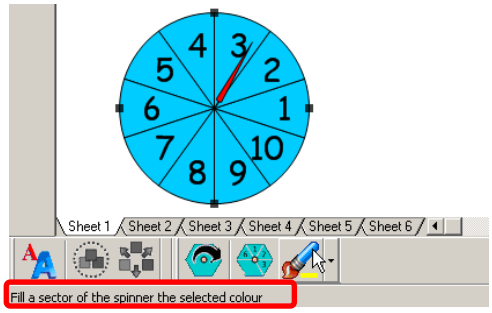
Drag objects into the Waste bin to remove them from the workspace.

Sheet tabs

Each 'mem' file (see page 5) contains six sheets on which you can set up a series of activities. The individual sheets are available via the tabs labelled Sheet 1, Sheet 2, etc. in the lower left-hand corner of the sheet. Click them to reveal blank sheets.

Status bar

The bottom row on the workspace is a Status bar that reveals more information about menu options and buttons. Hover over a menu option or a button and refer to the Status bar to read information about the action that will be performed.



Move the cursor over buttons to reveal relevant information in the Status bar.

Scroll bars

The scroll bars on the right and bottom of the sheet allow you to use more space than is initially visible onscreen. You can set up portions of the activity that are initially hidden and then reveal them by scrolling when necessary.

❸ Specialised tools

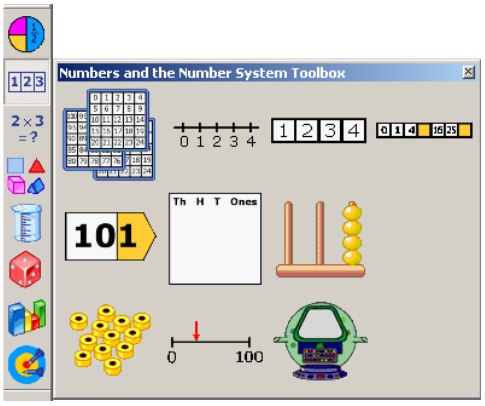
To insert a tool from any specialised toolbox:

1. Click the desired toolbox button on the Toolbox Bar.
2. Choose a tool and click its icon to insert it on the sheet.

Inserting some tools will bring up a dialogue box that can be used to specify the variables for that tool. Inserting other tools places the tool directly on the sheet.

Several different tools (or versions of the same tool) can be placed on the sheet together.

Clicking a tool when it has been inserted on a sheet usually reveals a toolbar for that tool along the bottom of the sheet. This allows you to change the tool's appearance and behaviour. See the descriptions of the individual tools for details.

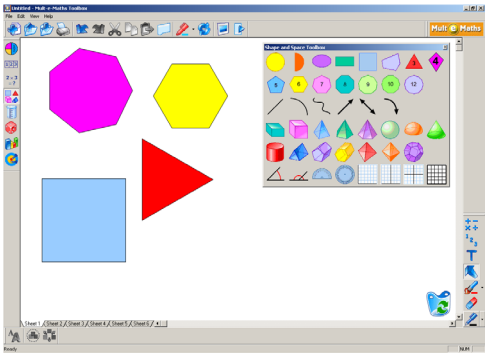


The Toolbox Bar with Numbers tools revealed.

To keep a toolbox open on the screen:

1. Click the desired toolbox button on the Toolbox Bar.
2. Drag the toolbox to the side of the sheet.
3. Click and drag your chosen tools onto the sheet.
4. Click the close button on the toolbox when you want to close it.

In this way you can, for example, keep adding shapes to the sheet without having to reopen the Shape and Space Toolbox for each shape.



Drag the Shape and Space Toolbox to the side of the screen to access all the available shapes easily.

Fractions Toolbox

Fraction Labels

This tool generates fractions in the form of labels.

To insert a preformed fraction label:

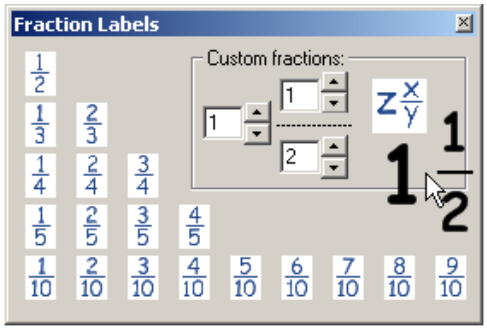
Click on one of the preformed fractions on the 'Fractions Labels' dialogue box and drag onto the sheet.

To create a customised fraction label:

1. Use the scroll arrows on the 'Fractions Labels' dialogue box to select an integer (0–99), a numerator (1–99) and a denominator (2–99).
2. Click the $z\frac{x}{y}$ button and drag the fraction label you have created onto the sheet.

Selecting a label displays the abbreviated font toolbar (see page 8), which allows you to change the style and size of the label font.

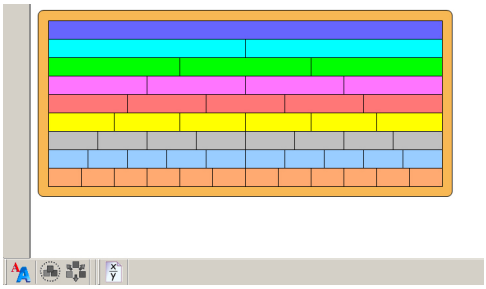
Tip: Fraction labels can also be dragged over the input fraction on the Equivalence Machine (see page 12) to change its value. Fractions greater than 1 will be displayed as improper fractions on the Equivalence Machine.



The 'Fractions Labels' dialogue box

Fraction Wall

This tool creates a fraction wall with fraction bars ranging from 1 whole to $^{1}/_{12}$.



The Fraction Wall with its toolbar

Click the orange border of the Fraction Wall to display the 'Show/Hide labels' button on the toolbar. Click this button to show fraction labels on the bars.

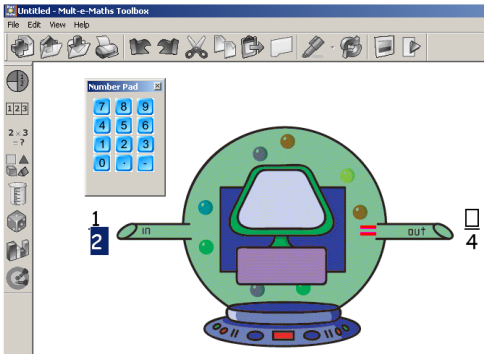
You can drag individual bars from the fraction wall onto the sheet. When placed near one another, the bars snap together and are automatically grouped. Separate grouped bars by selecting the group of bars and clicking the 'Ungroup' button on the Properties Toolbar (see page 9).

To remove unwanted bars from the sheet drag them to the Waste bin.

Clicking the 'Edit Properties' button when the Fraction Wall is selected allows you to alter the colour of the bars or change the font of the fraction labels.

Equivalence Machine

This tool calculates equivalent fractions.



The Equivalence Machine tool

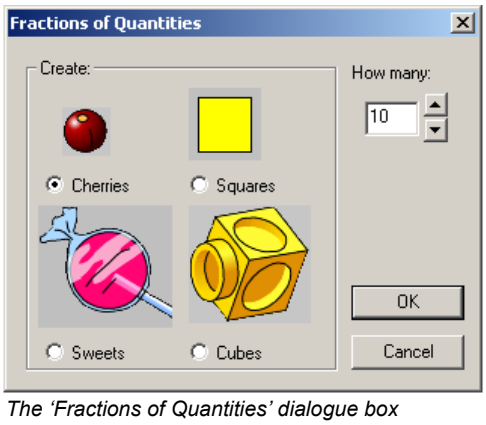
1. Click the numerator and/or denominator on the input fraction and change the fraction using the pop-up Number pad.
2. Enter a numerator or denominator for the equivalent fraction by clicking it and using the Number pad.
3. Click the red equals sign to compute the equivalent fraction.

You can also use the Fraction Labels Tool (see page 11) to change the input fraction.

Tip: You could prepare a selection of numbers on screen to use during the activity. Create numbers with up to 5 digits on the Symbol pad and drag them onto the sheet. These numbers can then be dragged on top of the numerator or denominator on either the input or the output fraction, when required.

Fractions of Quantities

This tool allows you to demonstrate finding fractions of up to 24 objects.



The 'Fractions of Quantities' dialogue box

To create quantities of identical objects:

1. Choose 'Cherries' or 'Squares' and the number of objects with which you would like to work.
2. Click 'OK'.

You can drag the objects on the sheet into groups.

To create quantities of different objects:

1. Choose 'Sweets' and the number you would like to work with.
2. Click 'OK'. The sweets appear in random proportions of three different varieties.

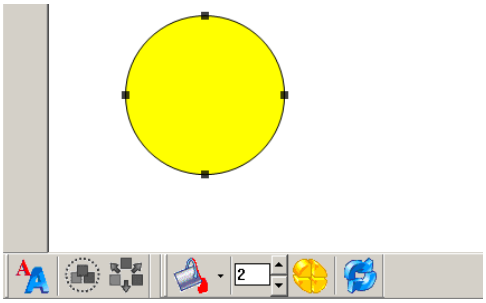
To use the 'Cubes' option:

1. Choose 'Cubes' and the number you would like to work with.
2. Click 'OK'. The cubes appear connected in a line in a random distribution of four different colours.

Clicking on the line of cubes allows you to drag it as a whole. When a line of cubes is selected, clicking the 'Break cubes' button on the toolbar and then clicking between two cubes breaks the line at that point. Drag the separated lines end to end to rejoin them.

Fractions of Circles

This tool creates a circle which can be divided into equal parts.



A circle with the fractions of shapes toolbar

Click on the circle to reveal the **fraction of shapes toolbar**.

The initial circle can be resized by clicking and dragging on any of the four handles.

To change the circle's colour click on the 'Fill colour' button and choose a new colour. Then click the circle.

To divide the circle:

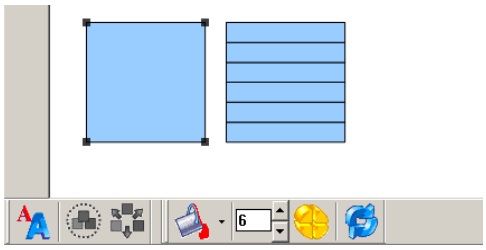
1. Use the scroll arrows on the toolbar to select the number of sectors, up to 10, to divide the circle into.
2. Click the 'Divide' button to split the circle into the specified number of sectors.

Sectors can be dragged or grouped, or can be manipulated using the 2-D object toolbar (see page 20) revealed when a sector is clicked on.

Tip: Change the fill colour of one sector and use the rotate tool to rotate the sector around the centre of the circle to demonstrate that all of the sectors are the same size.

Fractions of Squares

This tool works in the same way as Fractions of Circles described above, but with a square being divided into equal rectangles.



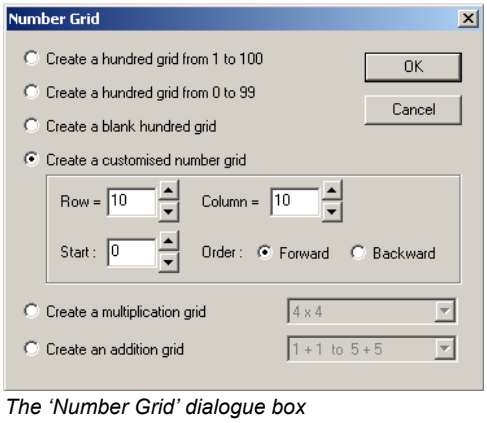
A square with the fractions of shapes toolbar

To divide the square into vertically orientated rectangles, first rotate the square through 90° using the 'Rotate' button on the **fractions of shapes toolbar**.

Numbers Toolbox

Number Grids

This tool allows you to create a variety of number grids using preformatted or customisable options. The numbers from a number grid can be dragged and dropped onto the sheet or onto other tools.


Number Grid
Create a hundred grid from 1 to 100
Create a hundred grid from 0 to 99
Create a blank hundred grid
Create a customised number grid
OK
Cancel
Row = 10
Column = 10
Start : 0
Order : Forward Backward
Create a multiplication grid
4 x 4
Create an addition grid
1 + 1 to 5 + 5

The 'Number Grid' dialogue box

To create a standard hundred grid:

1. On the 'Number Grid' dialogue box, select one of the first three options.
2. Click 'OK'.

The first two options produce grids numbered from 1 to 100 or from 0 to 99. The third option produces a blank hundred grid.

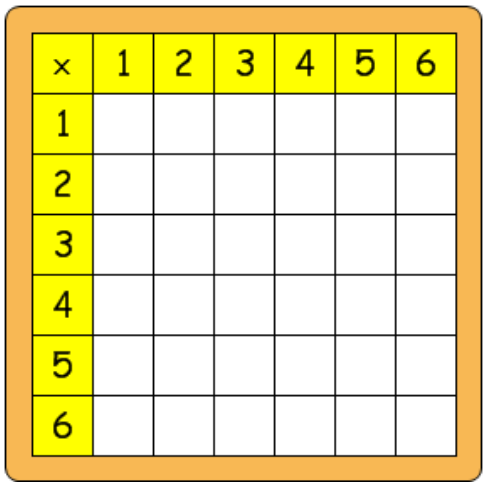
To create a customised number grid:

1. On the 'Number Grid' dialogue box, select the fourth option.
2. Use the scroll arrows to choose the number of rows, number of columns, starting number and order.
3. Click 'OK'.

To create multiplication or addition grids:

1. On the 'Number Grid' dialogue box, choose one of the bottom two options.
2. Choose the range of the grid using the drop-down menus.
3. Click 'OK'.

Note: Multiplication and addition grids appear initially with the 'answer values' hidden.

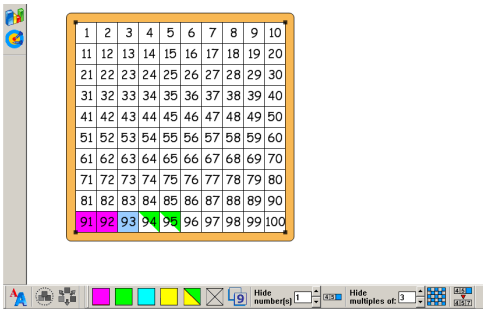


A 6 × 6 multiplication grid with the products hidden

To highlight squares on your number grid:

1. Click on the orange border of your number grid to reveal the **number grid toolbar**.
2. Click on a 'Fill colour' button on the toolbar.
3. Click a square to highlight it in the selected colour. Click and drag along a row or column to highlight multiple squares.

Choose the 'Full/half' button to toggle to filling half squares. Use the 'Remove colour' button to erase colour from a square by clicking.



A 1 to 100 grid with the number grid toolbar

To hide/reveal squares using the number grid toolbar:

Click on the 'Show/hide number' button and then on individual cells to hide or show their numbers.

Use this feature to hide one or more randomly chosen numbers. Use the scroll arrows to select how many numbers you would like to hide, then click the 'Random hide' button.

Use this feature to hide all the multiples of a particular number. Use the scroll arrows to select the multiples you would like to hide, then click the 'Hide multiples' button.

Click on the 'Reveal all' button to reveal all the hidden numbers at once.

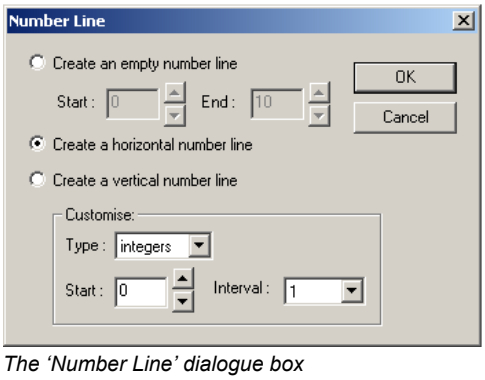
Tip: Create a customised number grid, then drag all the numbers into the Waste bin. You can then enter your own numbers or text onto the grid and use the 'Show/hide' feature to create games.

Number Lines

This tool allows you to create an empty number line with just the start and end values labelled, or a horizontal or a vertical line with 11 numbers displayed at specified intervals.

To create an empty number line:

1. Choose the first option on the 'Number Line' dialogue box.
2. Use the scroll arrows to set Start and End values.
3. Click 'OK'.

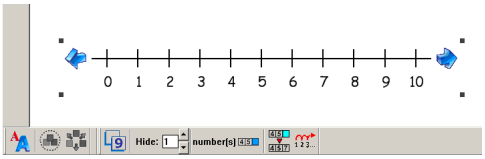


The 'Number Line' dialogue box

To create horizontal or vertical number lines:

1. On the 'Number Line' dialogue box, choose the second or third option.
2. Specify the Start and Interval values. For horizontal number lines you can also specify the number type (integers, decimals or fractions).
3. Click 'OK'.

To use the horizontal and vertical number line features:

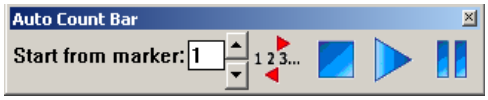


A horizontal number line with the number line toolbar

Click the blue arrows to scroll forwards or backwards along the number line.

Select your number line to reveal the **number line toolbar**.

Click to reveal the Auto Count Bar. Choose the position of the starting value (1 = 1st value on the number line, 2 = 2nd value …) and click 'Start' to begin the autocount feature. Click the 'Count on/back' button to reverse the direction of the count. The 'Pause' button allows you to temporarily stop the autocount. The 'Stop' button resets the autocount.

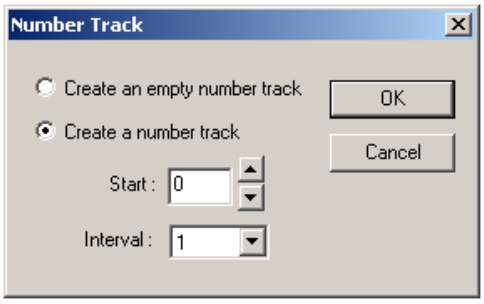


The Auto Count Bar

See the number grid toolbar (page 14) for descriptions of the functionality of the other buttons on the number line toolbar.

Number Tracks

This tool displays a number track with 11 parts which can be empty or numbered.



The 'Number Track' dialogue box

To create an empty number track:

1. Choose the first option on the 'Number Track' dialogue box.
2. Click 'OK'.

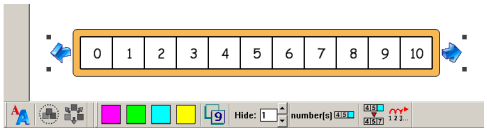
To create a filled number track:

1. Choose the second option on the 'Number Track' dialogue box.
2. Use the scroll arrows to specify the Start and Interval values.
3. Click 'OK'.

To use the number track features:

Click the blue arrows to scroll forwards or backwards along the filled number track. (The number track is designed mainly for younger children and therefore, unlike the Number Lines (see page 14), will not display negative numbers.)

Select your number track, by clicking on its orange border, to reveal the **number track toolbar**.



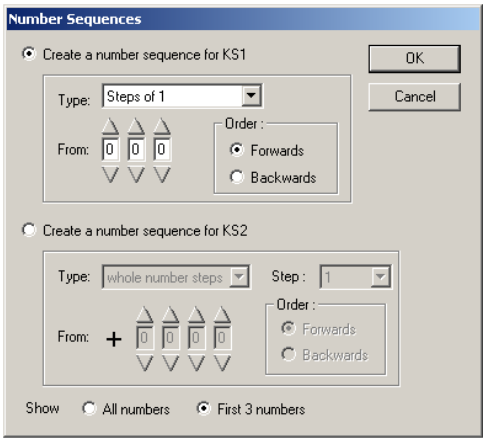
A number track with the number track toolbar

Use the 'Colour fill' buttons to highlight squares. Use the 'Show/hide numbers' button , the 'Random hide' feature Hide number(s) and the 'Reveal all' button to hide and reveal numbers as required. See the number grid toolbar (see page 14) for more detailed descriptions of these buttons.

The Auto Count Bar acts in the same way as for Number Lines (see page 14) except that it does not count below zero.

Number Sequences

This tool allows you to generate a sequence of 10 values. Sequences are categorised as either Key Stage 1 or Key Stage 2 according to their complexity.



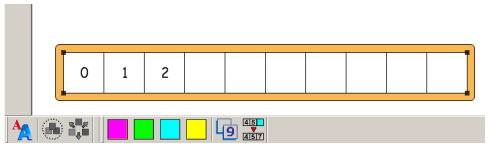
The 'Number Sequences' dialogue box

To create a number sequence:

1. Choose the complexity of the number sequence by selecting either the first or second option on the 'Number Sequences' dialogue box.
2. Select the type of sequence using the drop-down menu(s). For KS2 sequences, you will need to specify the type of numbers required (e.g. whole numbers, decimals, fractions) and the step size.
3. Set the starting value using the scroll arrows.
4. Choose the order (forwards or backwards).
5. Choose to show all numbers or just the first 3 numbers.
6. Click 'OK'.

To use the number sequence features:

Select your number sequence to reveal the **number sequence toolbar**.

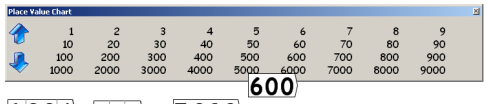


A number sequence with the number sequence toolbar

Use the 'Colour fill' buttons to highlight squares. Use the 'Show/hide' button and the 'Reveal all' button to hide and reveal numbers as required. See the number grid toolbar (see page 14) for more detailed descriptions of these buttons.

Place Value Chart

This tool allows you to create and combine place value cards.



1304 342 5000

The Place Value Chart tool

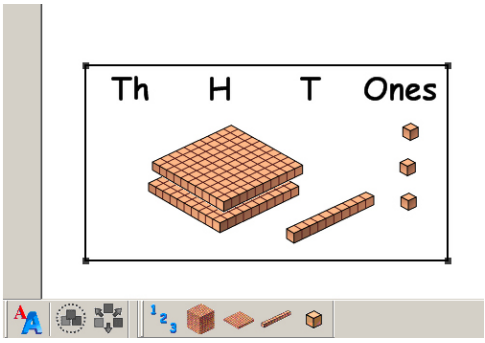
1. Click the arrows to scroll the rows of the chart up and down as required. (Available numbers range from 0.0001 to 900000.)
2. Click and drag on a number to display it as a place value card on the sheet.
3. Drag together cards with different place values to combine them. You can move combined cards as a single unit by dragging the largest digit. You can separate combined cards by dragging the smallest digit.

Tip: Before combining place value cards, change a card's numbers or background colour by selecting the card, clicking the 'Edit Properties' button and making the required changes.

Place Value Mat

This tool allows you to display the place value of the digits of a whole number with up to 4 digits.

Click on the Place Value Mat to reveal the **place value mat toolbar**. You can resize the mat by selecting it and dragging the corner handles.



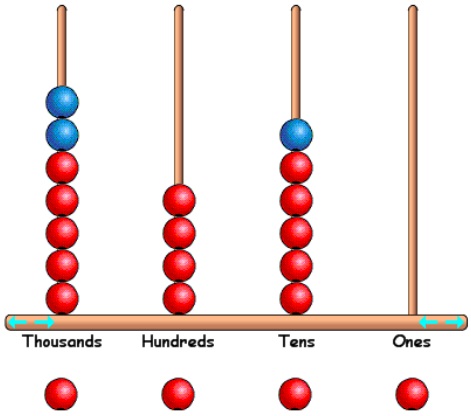
The Place Value Mat tool with its toolbar

To display a number:

Click on the 'Number pad' button on the **place value mat toolbar** and drag single digits from the Number pad onto the Place Value Mat, where they will snap to columns. Alternatively drag base 10 apparatus from the toolbar to the mat for a visual representation.

Abacus

This tool allows you to represent integers and decimals as beads on an abacus.



The Abacus tool

The abacus is displayed initially with four spikes labelled thousands, hundreds, tens and ones. It can also display tenths, hundredths and thousandths, and ten thousands, hundred thousands and millions. Click on the arrows on the base of the abacus to add extra spikes to the abacus or remove them according to your requirements.

Note: A decimal point appears on the base of the abacus to differentiate between whole number and decimal parts.

To add/remove beads:

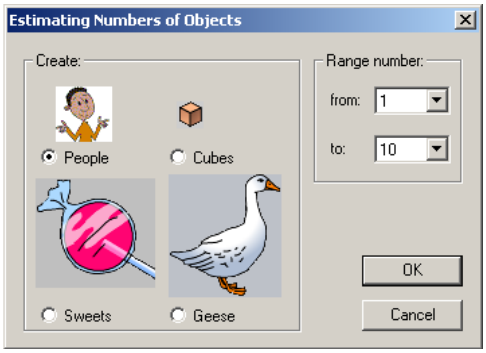
Click the bead button beneath a spike to place a bead on that spike.

The beads can be dragged off the spike to remove them from the abacus or to place them on other spikes.

Each abacus spike accommodates only 9 beads. Trying to add a tenth bead will cause the 9 beads to be replaced by a single bead of the next highest place value, e.g. trying to add 10 beads to the ones spike will remove all the beads from the ones spike and result in an extra bead on the tens spike.

Estimating Numbers of Objects

This tool creates a random number of objects on the sheet for children to estimate.



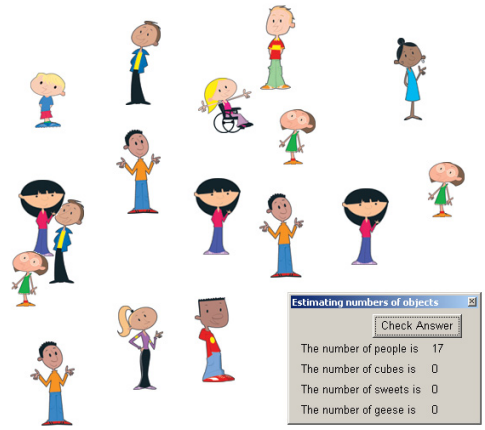
The 'Estimating Numbers of Objects' dialogue box

To add objects to the sheet:

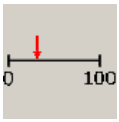
1. On the 'Estimating Numbers of Objects' dialogue box, choose a type of object. (For larger numbers of objects it is best to choose 'Cubes' to limit overlapping.)
2. Specify the Range values.
3. Click 'OK'.

To check estimates:

Click the 'Check Answer' button to reveal the number of each type of object on the sheet. This count will keep track of any objects added to the sheet, so you can add more objects and reveal the running total by clicking 'Check Answer' after each addition.

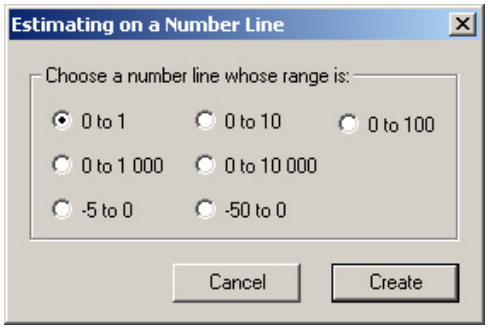

Estimating numbers of objects
Check Answer
The number of people is 17
The number of cubes is 0
The number of sweets is 0
The number of geese is 0

Check the number of objects on the sheet by clicking the 'Check Answer' button.



Estimating on a Number Line

This tool allows children to estimate the value of points on an undivided number line.



The 'Estimating on a Number Line' dialogue box

To create an estimating number line:

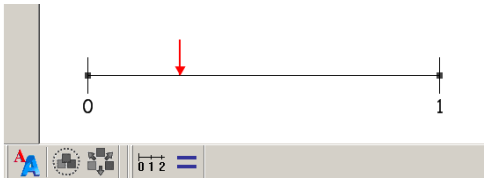
1. Choose a number line range on the 'Estimating on a Number Line' dialogue box.
2. Click 'Create'.
3. Click and drag the red arrow to any point on the line for children to estimate.

To use the estimating number line features:

To reveal division markers on the number line, click on the line and then on the 'Show/hide divisions and labels' button on the **estimating on a number line toolbar**.

To reveal the position of the arrow, click the 'Show/hide answer' button on the toolbar.

Drag the square grab handle at either end of the line to widen or narrow it: this is useful for comparing the positions of numbers on two different lines.



A number line with the estimating on a number line toolbar

Function Machine

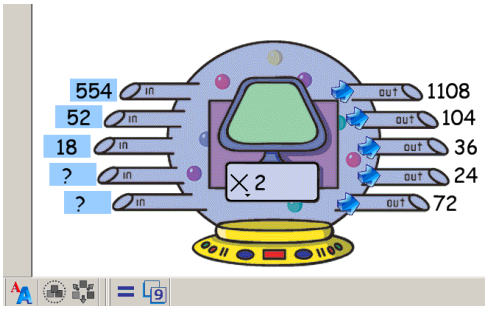
This tool calculates outputs for given inputs.

Click on your function machine to reveal the **function machine toolbar**.

To create inputs and outputs:

1. Click the blue panels and enter input values (from -99 999 to 99 999) using the pop-up Number pad.
2. Click the arrow, or the operation sign, in the panel on the machine to set the function (+, –, ×, ÷, x^2, √x). For the first four functions you can also set a related function value by clicking on the number to the right of the operation sign and using the pop-up Number pad.

Click the blue arrow button on each output pipe to reveal the outputs one by one, or click the 'Calculate' button on the **function machine toolbar** to reveal all outputs at once.



The Function Machine with some inputs missing

To hide/reveal values:

Click the 'Show/hide' button and then any value to replace it with a question mark. Clicking again reveals the value. In this way you can show outputs and ask children to identify hidden inputs.

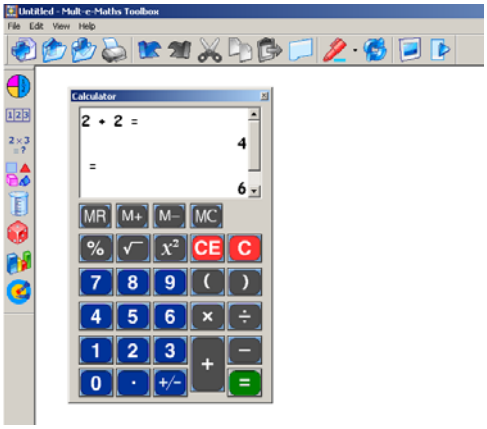
Calculations Toolbox

Calculator

This tool is an onscreen calculator which works in the same way as a handheld calculator.

The calculator screen displays both an input equation and its answer (up to 6 digits) simultaneously.

The calculator will continuously repeat the last operation when you click the '=' button repeatedly, e.g. if you enter 2 + 2 = 4 and then click '=' again, the calculator adds another 2 and the screen shows = 6 …



The Calculator Tool

The other tools in the Calculations Toolbox are all described earlier in this manual. They are:

Function Machine (see page 18)

Abacus (see page 17)

Number Grids (see page 13)

Number Lines (see page 14)

Number Tracks (see page 15)

Number Sequences (see page 16)

Shape and Space Toolbox

2-D Shapes

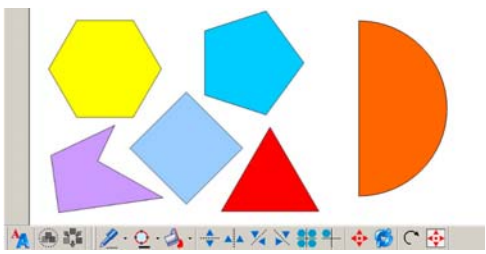
These tools allow you to create and manipulate 2-D shapes, including regular and irregular polygons.

Click on any of the first five shape buttons (Circle , Semi-circle , Ellipse , Rectangle or Square) to create your chosen shape automatically on the sheet. Clicking on your shape creates handles that can be dragged to resize the shape.

Tip: To alter the height-to-width ratio of a rectangle, select it and click on the 'Edit Properties' button . You can then change the dimensions by typing in new width and height values and clicking on 'OK'.

The 'Polygon' button enables you to draw any closed shape with straight sides. After clicking on the 'Polygon' button, create your polygon, one side at a time, by clicking where you would like the corners of your polygon to be. (You will need to click again on the starting corner to complete your polygon.) Clicking on your completed polygon creates handles that can be dragged to change the positions of its corners.

Click on any of the shape buttons with numbers at their centres, e.g. to create a regular polygon automatically on the sheet (Triangle, Quadrilateral, Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon or Dodecagon). Your shape will keep its regularity when resized, except for the quadrilateral, which appears as a square whose corners can be dragged to create any regular or irregular quadrilateral.



A selection of shapes and the 2-D object toolbar

Clicking on your 2-D shape will reveal the **2-D object toolbar**.
Note: When you insert a circle or a square, the fractions of shapes toolbar (see page 13) also appears.

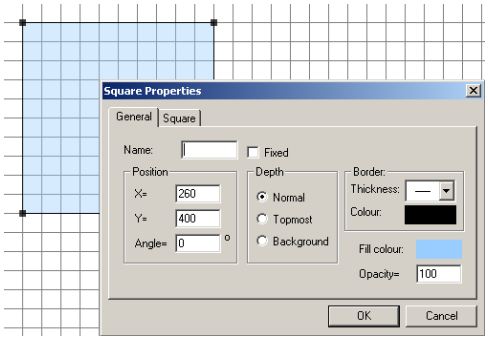
To change the appearance of a 2-D shape:

To alter a shape's border thickness, select the shape and choose a line thickness from the pop-up menu on the 'Line thickness' button on the **2-D object toolbar**.

To alter a shape's border colour, select the shape and choose a colour from the pop-up menu on the 'Border colour' button .

To change a shape's infill colour, select a colour from the pop-up menu on the 'Fill colour' button , then click on the shape.

Clicking on the 'Edit Properties' button allows you to make the fill colour of a selected shape transparent, so that grid lines or other shapes can be seen through it. On the General tab of the 'Properties' dialogue box, lower the Opacity value in the box (100 is recommended) and then click on 'OK'.



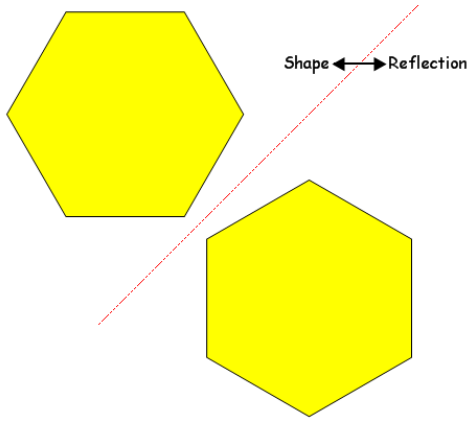
Make shapes transparent by changing the Opacity value in the 'Properties' dialogue box.

To reflect a 2-D shape:

1. Select the shape, then click a mirror line button: for a vertical mirror line, for a horizontal mirror line, or for a diagonal mirror line. Then click on the sheet to insert a mirror line in the required position relative to your shape.

   The mirror line can be repositioned by dragging. You can also toggle the words 'Shape' and 'Reflection' on the mirror line by clicking on the black double-headed arrow.

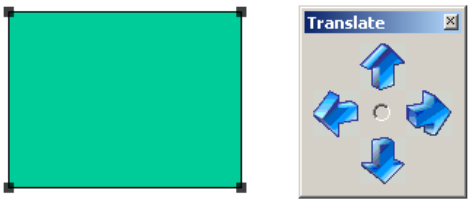
2. Click your shape and then the 'Reflect' button to reflect the shape about the mirror line. The 'Clear reflection' button clears any reflected shapes from the sheet.



A shape and its reflection in a diagonal mirror line

To translate a 2-D shape manually:

1. Create a shape on a co-ordinate grid (see page 23).
2. Select your shape and then click the 'Translate manually' button to open the 'Translate' dialogue box.
3. Click the arrows on the box to translate the shape one grid square at a time. (**Note**: If you use the translation tool on backgrounds other than a co-ordinate grid, each step will be equivalent to just a few pixels.)

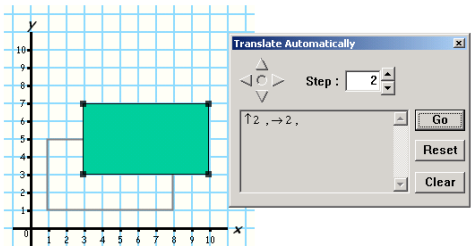


Translate a shape manually using arrow buttons.

To translate a 2-D shape automatically:

1. Create a shape on a co-ordinate grid (see page 23). (**Note:** As with the manual translation tool, translation steps made on backgrounds other than a co-ordinate grid, will each be equivalent to just a few pixels.)
2. Select your shape and then click the 'Translate automatically' button to open the 'Translate automatically' dialogue box.
3. Enter a move in the dialogue box using the scroll arrows to choose the step value and the direction arrows to choose a direction. A sequence of moves can be entered in this way.
4. Click the 'Go' button to translate the shape according to your instructions. A trace of the shape's original position will remain so you can compare it with the shape's new position.

The 'Reset' button returns the shape to its original position without removing the instructions from the dialogue box.
The 'Clear' button removes all instructions from the dialogue box without returning the shape to its original position.



Translation of a rectangle 2 steps up and 2 steps to the right.

To rotate a 2-D shape manually:

1. Select the shape and click the 'Rotate' button .
2. Drag the shape to rotate it about its centre (marked by ⊕).

Tip: The centre of rotation (⊕) can be dragged to change the point about which the shape rotates, e.g. to allow a shape to be rotated about the origin (0, 0) of a co-ordinate grid (see page 23).

To rotate a 2-D shape automatically:

1. Select the shape and click the 'Rotate automatically' button . The 'Rotation Bar' dialogue box will appear.
2. Use the scroll arrows on the 'Rotation Bar' dialogue box to set the number of degrees you wish to rotate your shape through. (As with manual rotation, the centre of rotation, marked by ⊕, can be dragged from the centre of the shape to change the point about which the shape rotates.)
3. Click the 'Clockwise' or 'Anti-clockwise' button to rotate your shape according to your instructions. A trace of the shape's original orientation will remain so you can compare it with the shape's new orientation.

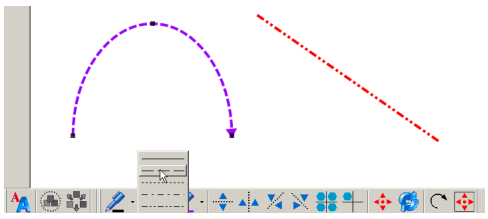
The 'Rotation Bar' dialogue box allows you to rotate shapes automatically.

The 'Centre of rotation' button resets the centre of rotation to the centre of the shape.
The 'Reset' button returns the shape to its original orientation.

Lines and Arrows

These tools enable you to create different types of lines (straight , curved and free-hand) and arrows (single-headed straight , double-headed straight and single-headed curved).

Select the appropriate button for your chosen line/arrow type, click on the sheet where you want your line/arrow to begin and then drag the cursor to where you want it to end.


An arrow and a line with the line toolbar

To change the appearance of a line/arrow:

Click on your line or arrow to reveal the **line toolbar**. Use the pop-up menus on the 'Line thickness' , 'Line style' and 'Line colour' buttons to produce the required appearance for your line/arrow.

The other buttons on the **line toolbar** match those described for the 2-D object toolbar (see page 20).

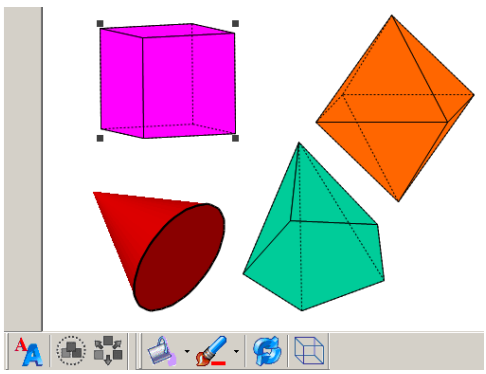
3-D Shapes

These tools allow you to create and manipulate 3-D shapes.

Click on any of the shape buttons (Cuboid, Cube, Square-based Pyramid, Pentagon-based Pyramid, Hexagon-based Pyramid, Sphere, Hemi-sphere, Cone, Cylinder, Triangular Prism, Pentagonal Prism, Hexagonal Prism, Regular Tetrahedron, Regular Octahedron or Regular Dodecahedron) to create your chosen shape automatically on the sheet.

Clicking on your shape creates handles that can be dragged to resize the shape.

Tip: To alter the height-to-width ratio of a cone, pyramid, cylinder, prism or cuboid, select it and click on the 'Edit Properties' button . Type in new dimension values and implement the changes by clicking on 'OK'.


A selection of 3-D shapes with the 3-D object toolbar

Click on your 3-D shape to reveal the **3-D object toolbar**.

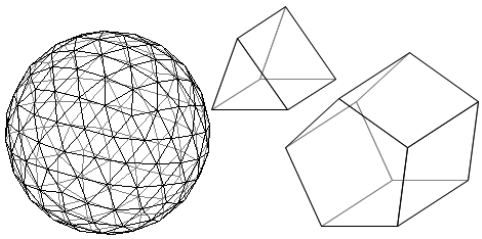
To use the 3-D shape features:

Choose a new fill colour for an entire shape from the pop-up menu. Then click the shape to change it to your chosen colour.

Choose a new fill colour for a single face of a shape from the pop-up menu. Then click a shape's face to change it to your chosen colour.

Click this button and then on a shape. Now drag the shape to rotate it.

Click to show a selected 3-D shape as a 'skeleton' shape.



'Skeleton' shapes

Angles

These tools allow you to display and manipulate angles.

Click the 'Angle' button to create a simple angle on the sheet.

Click the 'Horizontal Angle' button to create two angles on a straight line.

Click on your angle to reveal the **angle toolbar**. The , and buttons allow you to access the functionality of the Protractor Tools easily (see below).

To use the features of an 'Angle' (simple angle):

Change the size of a selected angle, or the length of its 'arms', by dragging the handles on its arms.

Use the 'Rotate' button to change the orientation of an angle. Click on the button, then on the angle and drag to rotate it about its vertex.

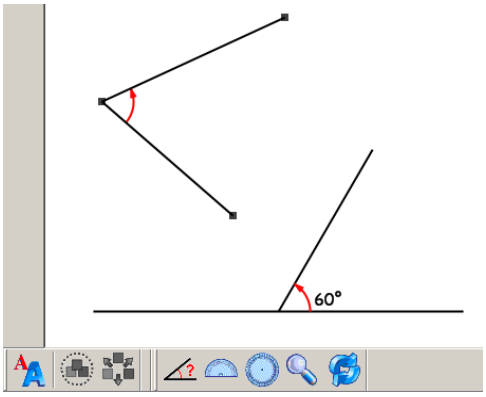
Click inside the red arc arrow on your angle, or on the 'Angle Checker' button on the toolbar to reveal the 'Angle Checker' dialogue box. Enter an estimate for the size of the angle using the scroll arrows, then click on 'Check'. A message will appear on the sheet giving you feedback about your estimate. A series of estimates can be entered to try to identify the exact size of the angle.

Tip: To find the exact size of a selected angle quickly you can click on the 'Edit Properties' button . Its size in degrees will be visible on the 'Angle' tab.

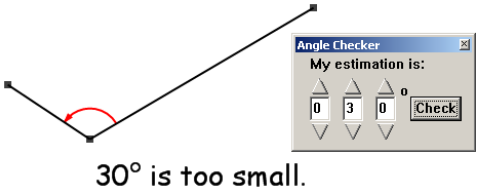
To use the features of a 'Horizontal Angle' (angles on a straight line):

Drag the handle on the centre line of a selected angle to change the size of the angles on either side.

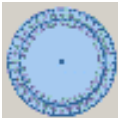
Click close to the vertex of either of the angles on the straight line to reveal its size.



The two types of angle with the angle toolbar



Estimate and check the size of an angle with the 'Angle Checker' dialogue box.

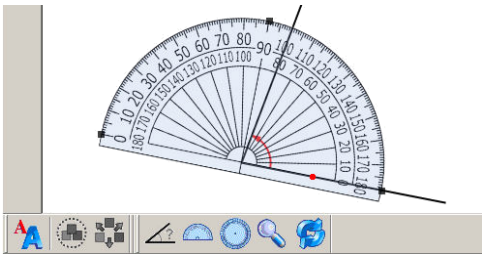


Protractors

These tools give a choice of two protractors (semi-circular: 180° and circular: 360°). Both protractors can be used to measure angles on the sheet. They can be used in conjunction with the Angle Tools (see above) or with shapes drawn using the 2-D Shape Tools (see page 19).

Click the appropriate button to insert a semi-circular or circular protractor on the sheet.

Click on your protractor to reveal the angle toolbar (see above).



The semi-circular protractor being used to measure an angle created using the Angle Tool

To use the features of the protractors:

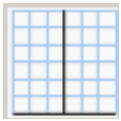
Resize a protractor by dragging the black square handles on its sides.

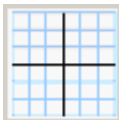
Reposition a protractor by clicking on it and dragging. When used with Angle Tools (see page 22), the protractors will snap to the vertex of the angle.

Rotate a protractor by clicking and dragging the small red dot on the protractor, or use the 'Rotate' button on the toolbar.

Click the 'Zoom' button and then on a protractor to create an enlarged view of that part of the protractor in the 'Zoom Bubble' window.

Co-ordinate Grids





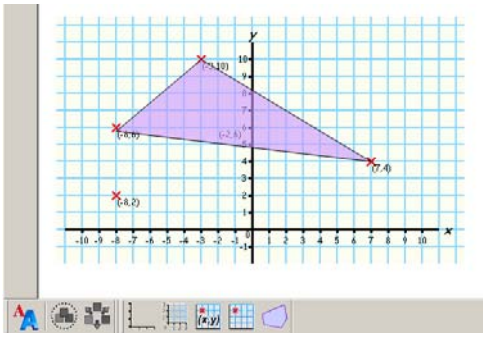
These tools provide a choice of three co-ordinate grids (Grid I: one quadrant; Grid II: two quadrants; Grid III: four quadrants).

Click the appropriate button to insert a co-ordinate grid.

Click on your grid to reveal the **co-ordinates toolbar**.

To plot a point:

Choose the 'Cross' button and click any gridline intersection on the grid to mark it with a cross.



A 2-quadrant co-ordinate grid with its toolbar

To identify the co-ordinates of a point:

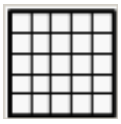
Choose the 'Co-ordinates label' button and click on a gridline intersection to reveal its co-ordinates.

To use other co-ordinate grid features:

Click to hide/show grid lines.

Click to hide/show axes labels.

Click to be able to draw a transparent polygon. To create your polygon, one side at a time, click where you would like the corners of your polygon to be. (You will need to click again on the starting corner to complete your polygon.)



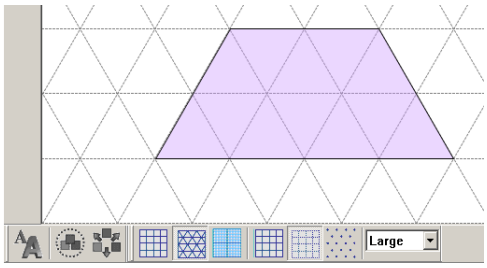
Background Grids

This tool allows you to cover the sheet with a background grid of squares or triangles, or with graph paper.

Selecting this option initially just displays the **background grid toolbar**.

Click a grid button on the toolbar to cover the sheet in that style of grid. To remove the grid click the same grid button again.

To close the background grid toolbar, open the Shape and Space Toolbox and click the 'Background Grids' button again.



The triangle style grid with the background grid toolbar

To change the square and the triangle background grids:

Use the 'Solid grid' , 'Dashed grid' or 'Dotty grid' buttons to toggle between grid line styles.

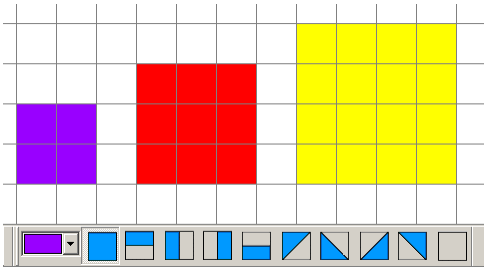
You can change the size of the background shapes (large, medium or small) using the pop-up size menu.

To use the additional features for the square grid:

For square grids, an additional toolbar appears which enables you to colour squares and half squares easily.

Choose a colour from the pop-up menu, click the required fill button, e.g. , or and then click on a grid square.

Colour can be removed from a square using the 'Remove colour' button .



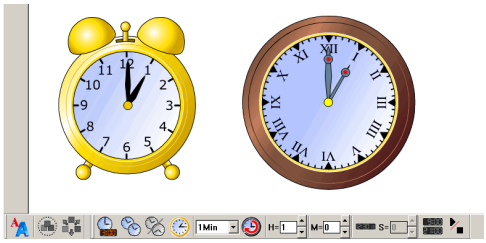
The square grid with its additional toolbar

Measures Toolbox

Clocks

These tools provide a choice of five different styles of analogue clock and a digital clock . The analogue clock types are:

- Simple Clock: no divisions
- Alarm Clock: hour divisions
- Station Clock: minute divisions and a second hand
- Roman Clock: Roman numerals and minute divisions
- 24-Hour Clock: minute divisions



Two clocks with the clock toolbar

Choose a clock type and click its icon to insert it on the sheet.

Click on your clock to reveal the **clock toolbar**.

It is possible to drag the numbers off the face of the Simple Clock and then to drag them back on again. The numbers on all analogue clocks can be toggled on and off using the 'Toggle numbers' button .

To change the time on a clock:

For any analogue clock, click on the red dot on a hand and drag the hand around the face.

For analogue and digital clocks, use the scroll arrows to change the H =, M = and S = inputs on the clock toolbar.

If you are using the Station Clock or the digital clock, you can toggle the seconds count on or off using the 'Show/hide seconds' button .

To change the time on an analogue clock you can drag the hands.

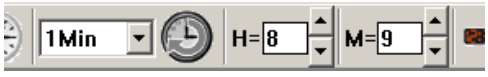
To link and unlink two clocks:

With this function, as you change the time on one of the linked clocks the other clock will change to reflect the same times.

1. Insert two clocks on the sheet.
2. Click on one clock to select it.
3. Click the 'Harmonise' button on the clock toolbar.
4. Click on the clock you wish to link with the selected clock.
5. Click the 'Separate' button to unlink the clocks.

To use other clock features:

Click on one clock on the sheet and select the 'Synchronise' button . Clicking on another clock on the sheet will cause it to reflect the current time of the first clock. This is useful for comparing analogue and digital times.
(**Note:** Unlike when the clocks are harmonised, the clocks will not be linked when you change the time.)



To change the time on a digital clock use the toolbar.

Select the digital clock and click the '12h/24h' button to toggle between a 12- and 24-hour time display.

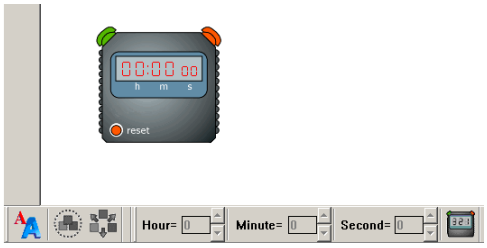
Select an analogue clock and use the pop-up menu on the toolbar to choose a time interval. Click the 'Interval' button to make the clock hands move forward by the chosen time interval.

Any clocks on the screen can display real time changes. For example, create a Station Clock on the screen and set it to the current time. Clicking on the 'Start /Stop' button will now show the second hand moving in real time.

Stopwatch

This tool can be used to count up or down in seconds.

Click the stopwatch icon to insert it on the sheet.



The Stopwatch Tool with its toolbar

To count up (default setting):

Click the green button on the top left of the stopwatch to begin counting up.

Click the red button on the top right to stop counting up.

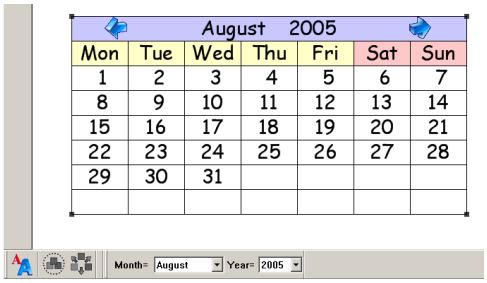
Click 'reset' to set the stopwatch back to 00:00 00.

To count down:

1. Click on your stopwatch to reveal the **stopwatch toolbar**.
2. Click the 'Count up/down' button to toggle to count down mode.
3. Use the scroll arrows to set the Hour =, Minute =, Second = inputs as desired.
4. Click the green button on the top left of the stopwatch to begin counting down. Click the red button at the top right to stop the countdown. Click 'reset' to set the stopwatch back to 00:00 00.

Calendar

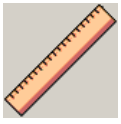
This tool produces a calendar page for any month of any year between 1900 and 2100.



The Calendar Tool with its toolbar

Click the 'Calendar' icon to insert a calendar page on the sheet. The calendar page produced will automatically be set to the present month and year according to your computer's internal clock.

Use the blue arrows at the top of the calendar page to scroll from month to month. You can also click on your calendar page to reveal its toolbar, and use the Month = and Year = inputs on the toolbar to select a different calendar page.



Ruler

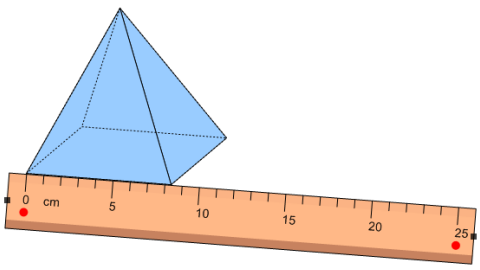
This tool is a ruler that can be dragged around to measure objects on the sheet.

Click the 'Ruler' icon to insert the ruler on the sheet. The default ruler has no number labels.

To use the ruler to measure objects:

Click and drag on the black square handle at either end of the ruler to change its length.

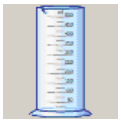
Click on either red dot on the ruler and drag, to rotate the ruler.



Using the ruler to measure an edge of a 3-D shape.

To show the ruler labels:

1. Select the ruler and click the 'Edit Properties' button .
2. Tick the 'Show labels' box at the bottom of the dialogue box. The default unit is cm. You can change this by typing in your own unit using your computer keyboard.



Measuring Cylinder

This tool displays a cylinder that can be filled with liquid. Measurements can be read off the scale.

Click the 'Measuring cylinder' icon to insert the cylinder on the sheet.

Click on your cylinder to reveal the **cylinder toolbar**.

To add and remove liquid:

Click the top tap to add liquid to the cylinder. Click the tap again to turn it off.

Click the bottom tap to remove liquid from the cylinder. Click the tap again to turn it off.

To add or remove a specific amount of liquid, use the scroll arrows on the right of the appropriate tap and then click the tap. Water will be added/removed in steps matching the selected interval size.

Tip: If the measuring cylinder appears too large for your screen resolution, a smaller version can be created by selecting the cylinder and then clicking the 'Edit Properties' button . You will need to tick the 'Small size' box and then click on 'OK'.

To change the cylinder size and scale:

To change the capacity of the cylinder, use the Cylinder Capacity pop-up menu on the cylinder toolbar.

To change the interval size of the divisions (and also the rate at which the liquid is added) use the Interval Size pop-up menu.

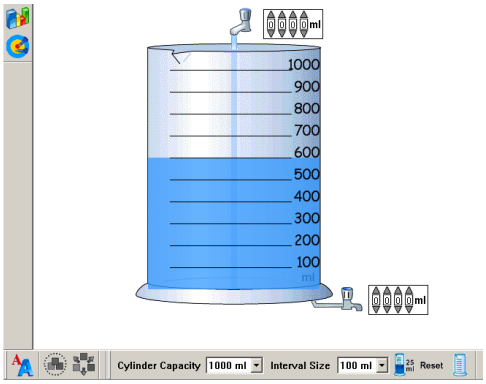
The table opposite details the possible interval sizes for each capacity.

To use other cylinder features:

Click the 'Reveal' button to show the current reading on the cylinder.

Click the 'Reset' button to empty the cylinder. The capacity and interval size settings will not be reset.

Click the 'Show/hide scale' button to hide/show the scale numbers.



The Measuring Cylinder tool with its toolbar

Capacity (ml)	Interval Size (ml)
50	2.5, 5
100	2, 5, 10
200	4, 10, 20
500	25, 50
1000	20 ,50 ,100

Available capacities and interval sizes

Kitchen Scales

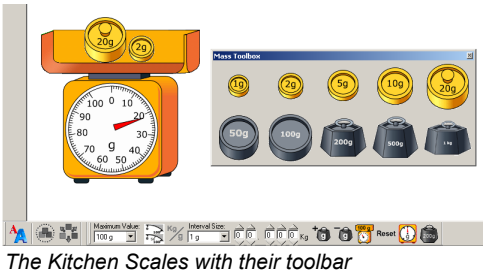
This tool displays a set of kitchen scales, with a circular dial, that can be used to display mass measurements.

Click on your kitchen scales to reveal the **kitchen scales toolbar**.

To add and remove visible masses:

Click the 'Mass Bar' button to reveal a menu of masses that can be dragged into the scale pan. The scale reading will reflect the amount of mass added to the scales.

You can drag masses back out of the scale pan. If you want to remove them from the screen drag them into the Waste bin.



The Kitchen Scales with their toolbar

To add and remove invisible masses:

1. Use the scroll arrows on the toolbar to select a mass value.
2. Click the 'Add weight' button to move the dial pointer gradually until it shows the mass you entered. This movement will happen in steps matching the selected Interval Size.

   You can also add an unspecified mass to the scale by zeroing the mass on the toolbar and clicking 'Add weight' once. Clicking again stops the addition of mass.
3. To remove mass from the scale, enter the amount you wish to remove using the scroll arrows and click the 'Remove weight' button . As before, an unspecified mass can be removed from the scales.

To change the maximum value on the scales dial:

There is the option to select the maximum value of the kitchen scale dial using the pop-up menu on the toolbar. The possibilities are: 100 g, 500 g, 1 kg, 3 kg, 5 kg or 10 kg. If the scales hold mass before you change the maximum value, the new dial will reflect this mass appropriately.

To change the interval size of the divisions (and also the rate at which the mass is added) use the Interval Size pop-up menu.

The table opposite details the possible interval sizes for each maximum weight.

Maximum weight	Interval Size (g)
100 g	1, 2, 5, 10
500 g	5, 10, 25, 50
1 kg	5, 10, 50, 100
3 kg	25, 50, 100, 200
5 kg	25, 50, 100, 200
10 kg	50, 100, 200, 500

Available maximum weights and interval sizes

To use the other kitchen scales features:

Click the 'Show/hide halfway points' button to toggle on and off intermediate labels on the 500 g, 3 kg and 5 kg scales.

Click the 'Toggle Kg/g' button to toggle the display between grams and kilograms on the 1 kg and 3 kg scales.

Click the 'Show weight' button to show/hide the current mass in the scale pan.

Click the 'Reset' button Reset to zero the scale pointer and the mass value on the toolbar. It does not reset the maximum value or the interval size.

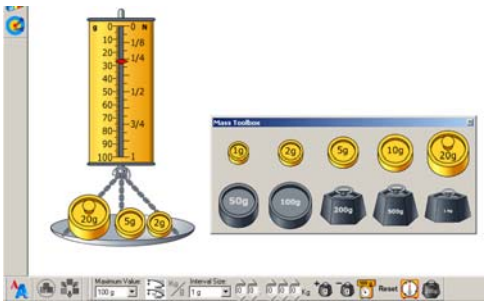
Click the 'Show/hide scale' button to toggle the scale labels on and off.

Spring Balance

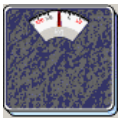
This tool displays a spring balance that can be used to display mass and weight measurements.

The scale on the left of the spring balance is labelled in kilograms or grams, and the scale on the right of the spring balance is labelled in newtons (N).

Click on your spring balance to reveal its toolbar. The Spring Balance Tool works in the same way as the Kitchen Scales Tool (see page 26).



The Spring Balance with its toolbar



Bathroom Scales

This tool displays bathroom scales that can display measurements of up to 120 kg.

Click on the scales to reveal their toolbar. The Bathroom Scales Tool works in the same way as the Kitchen Scales Tool (see page 26), although you cannot change the maximum value or the interval size.

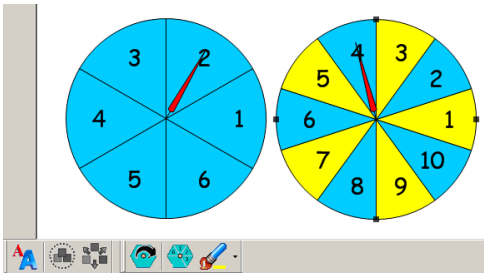
The Bathroom Scales with their toolbar

Probability Toolbox

Spinners

These tools allow you to insert a spinner with either 6 or 10 equal sectors.

Click on your spinner to reveal the **spinner toolbar**.



The two types of spinner with their toolbar

To use the features of the spinners:

Click the 'Spin' button to spin a selected spinner. The spinner will stop of its own accord, but you can stop it manually by clicking on the 'Spin' button again.

Click the 'Remove divisions' button and then on a radius on the spinner to remove it. In this way you could, e.g. transform the 6-sector spinner into a spinner with 3 equal parts, or into a spinner with 4 equal parts and 1 larger part.

Choose a colour from the pop-up menu on the 'Fill colour' button and then click on a spinner sector to change its colour.

Numbers can be dragged off of the spinner, if desired. You can also renumber a spinner by replacing the default numbers using numbers dragged from either the Symbol pad or the Number pad.

Dice

These tools allow you to insert either a dotty or a numbered die on the sheet.

Click on your die to reveal the **dice toolbar**.

The two types of die with their toolbar

To use the features of the dice:

Click the 'Roll' button to roll a die on the sheet. If there are two or more dice on the sheet, they will all roll simultaneously.

The and buttons allow you to create more of each type of die, without returning to the Probability Toolbox.

Coin

This tool inserts a coin (a Victorian sixpence) on the sheet.

Click on your coin to reveal the **coin toolbar**.

Two tossable coins with their toolbar

To use the features of the coin:

Click the 'Toss' button to toss a coin on the sheet. If there are two or more coins on the sheet, they will all toss simultaneously.

The 'Coin' button allows you to insert more coins on the sheet without returning to the Probability Toolbox.

Marble Bag

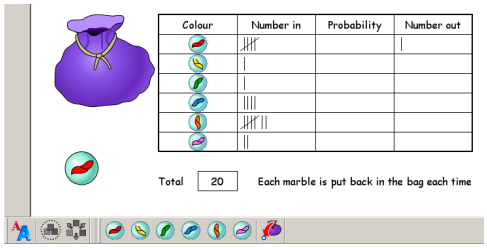
This tool allows you to explore probability using a bag of marbles. Clicking on the icon produces a 'bag of marbles' and a tally chart.

Click on your marble bag to reveal the **marble toolbar**.

To use the features of the Marble Bag Tool:

1. Click the coloured marble buttons to add marbles to the bag up to maximum of 20. Each click adds one marble of that colour, which is recorded as a tally on the chart. The total number of marbles added to the bag is recorded beneath the tally chart.
2. Click the 'Remove' button to withdraw a marble at random from those you have added. Each time you remove a marble it is returned to the bag before the next marble is withdrawn. These results are tracked in the 'Number out' column on the tally chart.
3. Use the pen tool to record expected outcomes in the 'Probability' column of the tally chart.

Tip: Ask children to estimate the probability of withdrawing a marble of a particular colour, based on the number of marbles added to the bag. Then compare the suggested probability with the actual number of times that colour of marble is drawn from the bag after 25 withdrawals from the bag.



The Marble Bag Tool with its toolbar

Handling Data Toolbox

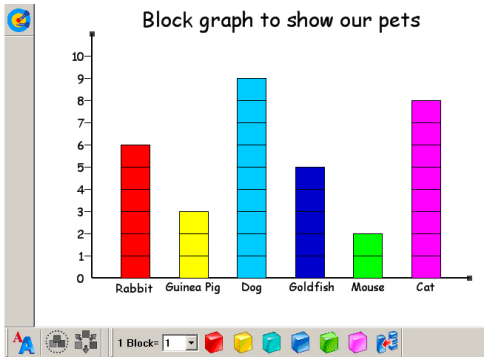
Block Graph

This tool allows you to create your own block graph which can then be transformed into a bar graph.

Click on your graph to reveal the **block graph toolbar**.

To use the features of the block graph:

1. Double-click on the title and labels to change them using the Keyboard pad. (Close the pad by clicking on a blank part of the sheet.)
2. Use the pop-up '1 Block =' menu to change the scale as required. (Each block can represent 1, 2, 5, 10, 20, 50 or 100.)
3. Click the coloured block buttons to add them to the graph (red blocks will appear in the first column, yellow blocks in the second column …). You can drag any unwanted blocks into the Waste bin.
4. Click the 'Make Bar' button if you want to merge the blocks into bars.



The Block Graph Tool with its toolbar

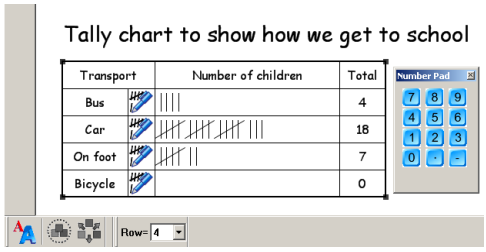
Tally Chart

This tool allows you to create your own tally chart.

Click on your chart to reveal the **tally chart toolbar**.

To use the features of the tally chart:

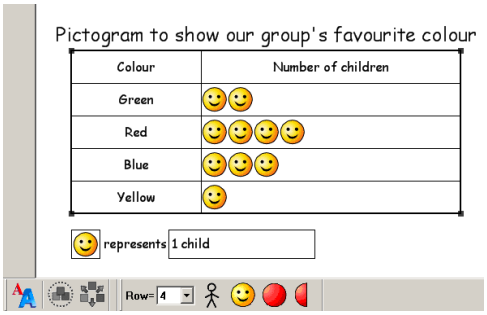
1. Double-click the title and labels to change them using the Keyboard pad. (Close the pad by clicking on a blank part of the sheet.)
2. Use the pop-up 'Row =' menu to change the number of rows, as required. (You can have from 1 to 6 rows.)
3. Click a button to add tally marks to that row of the chart, up to a maximum of 30.
4. Click a cell in the 'Total' column and enter the total of the tallies using the Number pad.



The Tally Chart Tool with its toolbar

Pictogram

This tool allows you to create your own pictogram using whole or half symbols.

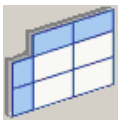


The Pictogram Tool with its toolbar

Click on your chart to reveal the **pictogram toolbar**.

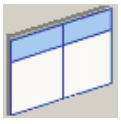
To use the features of the pictogram:

1. Double-click the title and labels to change them using the Keyboard pad. (Close the pad by clicking on a blank part of the sheet.)
2. Use the pop-up 'Row =' menu to change the number of rows, if desired. (You can have from 1 to 6 rows.)
3. Choose a symbol (stick person, smiley face, circle or half-circle) and click the appropriate button to add it to the sheet. Drag the symbol to the square box below the chart and click in the 'represents' box to enter a value and units using the Keyboard pad and the Number pad.
4. Click the chosen symbol button repeatedly to add more symbols and drag them into the appropriate rows to create your pictogram.

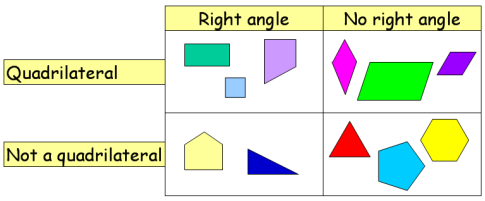


Carroll Diagrams

This tool allows you to create your own 1-criterion or 2-criteria Carroll diagrams.



(The Carroll diagrams have no specific toolbar.)



A 2-criteria Carroll diagram

To use the features of the Carroll diagrams:

1. The diagrams can be resized by dragging on the corner handles.
2. Double-click the column and row headings to change the labels using the Keyboard pad.
3. By dragging them into the Carroll diagram, sort numbers from the Symbol pad or from a Number Grid (see page 13), or shapes from the Shape and Space Toolbox (see page 19).

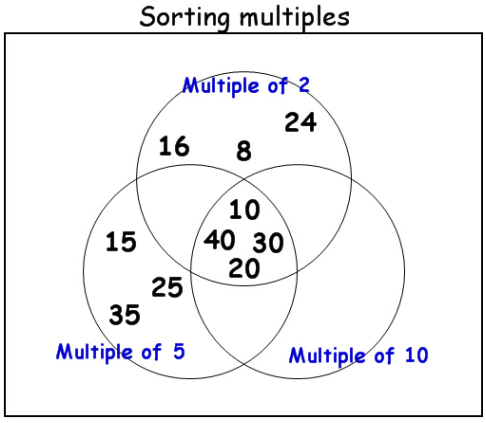
Venn Diagrams

This tool allows you create your own 1-criterion, 2-criteria or 3-criteria Venn diagrams.

(The Venn diagrams have no specific toolbar.)

To use the features of the Venn diagrams:

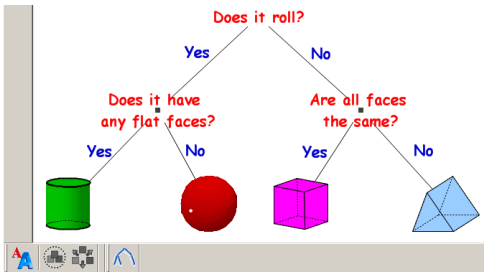
1. The rectangle and circle(s) of the diagram can be resized independently of one another by dragging their corner handles.
2. Double-click the title and labels to change them using the Keyboard pad.
3. By dragging them into the Venn diagram, sort numbers from the Symbol pad or from a Number Grid (see page 13), or shapes from the Shape and Space Toolbox (see page 19).



A 3-criteria Venn diagram

Tree Diagrams

This tool allows you to create a 2-, 4- or 8-outcome tree diagram.



The 4-outcome tree diagram with its toolbar

Click on your diagram to reveal the **tree diagram toolbar**

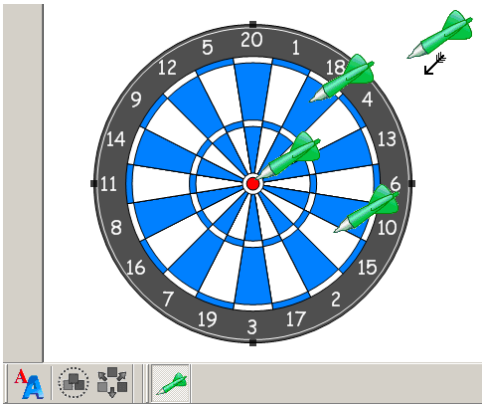
To use the features of the tree diagrams:

1. By dragging the square handles you can resize the whole diagram and adjust the length and position of each branch separately.
2. Use the 'Insert Text' button and the Keyboard pad to label the branches.
3. To remove a branch, select the 'Remove branches' button on the toolbar and click on a branch to erase it.

Solving Problems Toolbox

Dartboards

These tools allow you to insert a dartboard on the sheet. The three choices are: a typical dartboard; a dartboard without doubles or triples; a simple unnumbered target board.



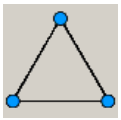
Use dartboards to create your own problems.

Click on your dartboard to reveal the **dartboard toolbar**.

To use the dart feature:

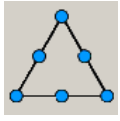
The 'Dart' button allows you to insert darts on the sheet without returning to the Solving Problems Toolbox. Click the 'Dart' button and then click repeatedly on the sheet with the dart cursor to create as many draggable darts as you require.

Use this tool to create your own problems for children to solve, e.g. 'How can you score 50 with three darts?

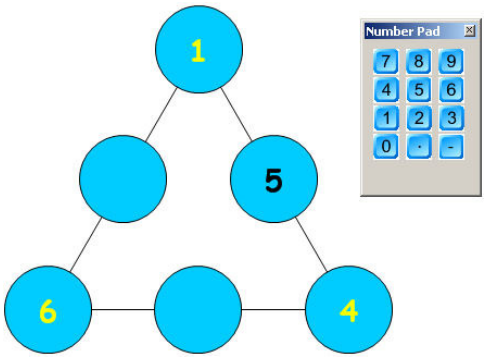


Arithmagons

These tools allow you to insert a 3- or 6-circle arithmagon on the sheet.



The arithmagons do not have a specific toolbar, but you can use the Number pad or Symbol pad on the Common Toolbar (see page 8) to enter numbers in each circle.



The number in the middle of each side is the sum of the two neighbouring yellow numbers. What are the missing numbers?

Create your own problems for children to solve, e.g. Put numbers on the corner circles of the 6-circle arithmagon and ask children to calculate the middle numbers, given that each middle number is the sum of the two neighbouring numbers.

Game Boards

These tools allow you to insert 3 different game board designs on the sheet: Snakes and ladders; Rocket; Treasure Island.

Click on your game board to reveal the **game board toolbar**.

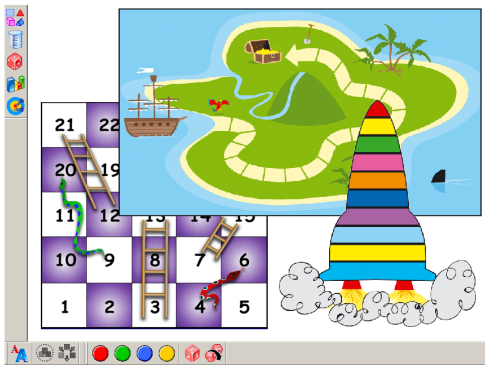
To use the game board features:

Click on a ‘Counter’ button , then click on the sheet to create a counter.

Click on the ‘Numbered Dice’ button to create a die on the sheet.

Click the ‘Roll’ button to roll your die or dice.

Tip: Add numbers to the Rocket or Treasure Island game boards using the Symbol pad, to create your own games.



The three game boards

The background grid (see page 23) is also available in the Solving Problems Toolbox.